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REGIONAL MISSILE DEFENSE

DOD's 2014 Report
Generally Addressed
Required Reporting
Elements, but
Excluded Additional
Key Details

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GAO Highlights

Highlights of [GAO-15-32](#), a report to congressional addressees

Why GAO Did This Study

Regional BMD constitutes an essential element in deterring enemies from using ballistic missiles and supporting defense commitments to U.S. allies and partners. DOD's 2010 *Ballistic Missile Defense Review Report* noted that the United States would pursue phased, tailored, and adaptive approaches to regional BMD in Europe, the Asia-Pacific region, and the Middle East. A provision in the National Defense Authorization Act (NDAA) for Fiscal Year 2014 mandated DOD to submit within 180 days a report to the congressional defense committees on eight elements related to the status and progress of regional BMD programs and efforts. The Joint Explanatory Statement accompanying the NDAA mandated that GAO provide its views on DOD's report. Separately, GAO was requested to provide its results in a written, publicly releasable form.

This report assesses the extent to which DOD's report addressed the required reporting elements and provides views on other key information, if any, that DOD could have included in the report. GAO used a scorecard methodology to compare the required reporting elements to the information in DOD's BMD report. Further, GAO reviewed the 2010 *Ballistic Missile Defense Review Report*, combatant commander integrated priority lists, and other DOD documents and policy, and interviewed DOD officials to gain further insight on DOD's regional BMD efforts.

What GAO Recommends

Because DOD prepared its report in response to a nonrecurring mandate, GAO is not making recommendations.

View [GAO-15-32](#). For more information, contact Joseph W. Kirschbaum at (202) 512-9971 or kirschbaumj@gao.gov.

December 2014

REGIONAL MISSILE DEFENSE

DOD's 2014 Report Generally Addressed Required Reporting Elements, but Excluded Additional Key Details

What GAO Found

The Department of Defense's (DOD) June 2014 regional ballistic missile defense (BMD) report addressed five of the eight required reporting elements, and partially addressed the remaining three required reporting elements.

- DOD's report addressed elements relating to a BMD risk assessment, the role that regional missile defenses play in the homeland defense mission, the integration of offensive and defensive capabilities, and two elements on the roles and contributions of allies.
- DOD's report partially addressed the required reporting elements regarding the alignment of regional approaches to missile defense with combatant command-integrated priorities, the concept of operations for the European Phased Adaptive Approach (EPAA), and the testing and development of key EPAA elements.

Additionally, GAO determined that DOD's report did not include key details for some elements that would have benefitted the congressional defense committees' oversight of DOD's regional BMD efforts. Generally accepted research standards for preparing sound and complete defense studies include providing complete, accurate, and relevant information. However, DOD's report does not consistently meet this standard, based on GAO's review. For example, the explanation in DOD's report of the North Atlantic Treaty Organization's transfer of authority process did not include sufficient detail to clearly convey the process. DOD's report also did not include details regarding the combatant commands' requirements, nor did it fully describe issues affecting the testing and development of key regional BMD systems (see fig.). DOD officials told GAO that the report was intended to address each of the eight required reporting elements concisely, that DOD regularly provides more detailed analysis on some of these topics to Congress via periodic briefings, and that they did not want to provide duplicative information in this report. GAO recognizes that judgment is needed in preparing reports to Congress; however, DOD's report did not include details on key BMD assets and risks to the EPAA schedule, which limits the report's utility to the congressional defense committees in their oversight of DOD's regional BMD programs.

Systems That Contribute to Regional Ballistic Missile Defense



SM-3: Standard Missile-3; BMD: Ballistic Missile Defense; AN/TPY-2: Forward-based Army Navy/Transportable Radar; C2BMC: Command, Control, Battle Management, and Communications Center; THAAD: Terminal High Altitude Area Defense

Source: GAO analysis of DOD documents (data); Missile Defense Agency and Air Force (images). | GAO-15-32

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Abbreviations

AN/TPY-2	Army Navy/Transportable Radar Surveillance and Control Model 2
BMD	ballistic missile defense
C2BMC	Command, Control, Battle Management, and Communications
DOD	Department of Defense
EPAA	European Phased Adaptive Approach
MDA	Missile Defense Agency
NATO	North Atlantic Treaty Organization
NDAA	National Defense Authorization Act
PAC-3	Patriot Advanced Capability-3
SM-3	Standard Missile-3
THAAD	Terminal High Altitude Area Defense

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December 1, 2014

Congressional Addressees

Regional ballistic missile defense (BMD) constitutes an essential element in both deterring enemies from using ballistic missiles and supporting defense commitments to U.S. allies and partners. The Department of Defense's (DOD) February 2010 *Ballistic Missile Defense Review Report* noted that the United States would pursue phased, tailored, and adaptive approaches to regional BMD in Europe—known as the European Phased Adaptive Approach (EPAA)—as well as in the Asia-Pacific region and the Middle East.¹ According to DOD, BMD combined with other U.S. capabilities reinforces regional defense throughout the spectrum of conflict—in peacetime, by providing opportunities for closer defense cooperation; in an escalating crisis, by preserving freedom of action and limiting coercion; and in a conflict, by reducing the effects of missile strikes.

Since 2002, DOD's Missile Defense Agency (MDA) has been developing and deploying the BMD system. From 2002 through 2014, MDA spent more than \$98 billion to develop and deploy a diverse collection of land-, sea-, and space-based assets, and plans to invest an additional \$38 billion for fiscal years 2014 through 2018 to continue its efforts. As DOD implements the EPAA and other regional BMD approaches, there are a number of factors that could complicate BMD operations. The factors include the interaction of various allies contributing to BMD, potential issues regarding the interoperability of BMD systems, and challenges with integrating offensive and defensive operations.

Section 233 of the National Defense Authorization Act for Fiscal Year 2014 required DOD to submit a report to the congressional defense committees on the status and progress of DOD's regional BMD programs and efforts, to include eight specific reporting elements, not later than 180 days after the date of the enactment of the act.² Among other things, the mandate required DOD to describe certain regional BMD risk

¹Department of Defense, *Ballistic Missile Defense Review Report* (Washington, DC: February 2010).

²Pub. L. No. 113-66, § 233(b) (2013).

assessments, discuss matters related to the EPAA concept of operations, describe progress made in developing and testing elements of systems intended for EPAA, and describe matters related to allied contributions to U.S. regional BMD activities. DOD responded to this mandate with a report submitted to congressional defense committees in June 2014.³

The Joint Explanatory Statement accompanying the National Defense Authorization Act for Fiscal Year 2014 also mandated that GAO provide its views on DOD's report. Separately, the Chairman of the Strategic Forces Subcommittee of the House Armed Services Committee, and the Ranking Member of the Strategic Forces Subcommittee of the Senate Armed Services Committee, requested that we provide the results of our review in a written, publicly releasable form. This report assesses the extent to which DOD's report addressed the required reporting elements and provides our views on other key information, if any, that DOD could have included in the report.

To assess the extent to which DOD's report addressed the required reporting elements, we compared the contents of DOD's June 2014 regional BMD report with the requirements established in section 233 of the National Defense Authorization Act for Fiscal Year 2014 by using a scorecard methodology. Specifically, we

- reviewed the language of section 233 to identify and document the required reporting elements and subelements;
- developed, based on the required reporting elements, scoring criteria to assess the report's content;
- assessed the extent to which the report's content addressed the required reporting elements by having three analysts independently compare the report's content to the scoring criteria; and
- compiled scorecard results of the three analysts in an anonymous format and, with the assistance of a research methodologist, reached a consensus on the final assigned score for each required reporting element.

Based on this review, the team determined whether the report's content addressed, partially addressed, or did not address each of the required reporting elements as follows:

³Department of Defense, *Regional Ballistic Missile Defense Report to Congress* (Washington, DC: June 20, 2014).

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- *Addressed:* The report contains information relating to the specific required reporting element and all its subelements.
 - *Partially addressed:* The report contains some, but not all, of the information required by the specific required reporting element or includes information on some, but not all, of its subelements.
 - *Not addressed:* The report does not mention any information relating to the specific required reporting element or any of its subelements.

We also collected documents and interviewed officials at organizations that DOD officials told us provided significant contributions to the report, such as the Office of the Under Secretary of Defense for Policy, Joint Staff, MDA, and U.S. Strategic Command, and we interviewed officials from the Office of the Under Secretary of Defense for Policy and Joint Staff about the process they used to prepare the report and for any other insights they might have on the content of the report. After we determined the extent to which the required reporting elements were addressed, we interviewed DOD officials regarding any elements that we rated as partially addressed to better understand why DOD reported or did not report certain information.

To provide our views on other information, if any, that DOD could have included in the report to better inform oversight by congressional committees, we identified information available to DOD as it was preparing its report. Specifically, we reviewed combatant commands' integrated priority lists,⁴ MDA acquisition and system engineering documentation, DOD's *Joint Integrated Air and Missile Defense: Vision 2020*,⁵ the 2012 *Ballistic Missile Defense System Warfighter Capability Acceptance* document,⁶ and other documentation to determine the

⁴Integrated priority lists outline each of the combatant commander's highest-priority requirements, defining program shortfalls that could adversely affect the ability of the combatant commander's forces to carry out their missions.

⁵This document summarizes DOD's approach to integrating passive and active defense capabilities and increasing cooperation with allies and partners. Department of Defense, *Joint Integrated Air and Missile Defense: Vision 2020* (Washington, DC: December 2013).

⁶The *BMD System Warfighter Capability Acceptance* document communicates the needs of the warfighter (i.e., the combatant commands and their service organizations responsible for executing BMD operations, together with U.S. Strategic Command and its relevant subordinate joint command) to MDA for the purposes of providing MDA a coherent, integrated warfighter voice defining BMD system testing needs. United States Strategic Command Joint Functional Component Command for Integrated Missile Defense, *BMD System Warfighter Capability Acceptance* (Schriever Air Force Base, CO: September 2012).

information available to DOD as it was preparing its report. Further, to help us provide views on other key information, if any, that DOD could have included in its report, we used generally accepted standards for a sound, complete, and high-quality defense research study that we identified in a 2006 GAO report.⁷ Specifically, we used the standards we previously identified that were related to the presentation of results, because this review focuses on the information contained in DOD's June 2014 regional BMD report. These specific standards include that the report address the objectives, that the conclusions be sound and complete, and that the study results be presented in a clear manner. We compared these specific standards to the contents of DOD's June 2014 report and to the other information available to DOD to determine what details, if any, DOD excluded from its report. We also reviewed relevant DOD documents to determine examples of other information DOD had on regional BMD operations, such as the Joint Force Readiness Review, the 2010 *Ballistic Missile Defense Review Report*, and a briefing on the employment of BMD assets with the North Atlantic Treaty Organization (NATO). Furthermore, we interviewed DOD officials who compiled the report regarding the approach they used to develop the report, including their rationale for choosing the level of detail that they provided for particular elements in the report.

We conducted this performance audit from May 2014 to December 2014 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

⁷GAO, *Defense Transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study and Report*, [GAO-06-938](#) (Washington, DC: Sept. 20, 2006). In this report, we reviewed research literature and DOD guidance and identified frequently occurring, generally accepted research standards that are relevant for defense studies.

Background

Section 233 of the National Defense Authorization Act for Fiscal Year 2014 required DOD to report on various regional BMD topics, including the eight specific elements presented in table 1, by June 24, 2014.⁸

Table 1: Regional Ballistic Missile Defense (BMD) Required Reporting Elements from the National Defense Authorization Act for Fiscal Year 2014

Element	Description
A	A description of the overall risk assessment from the most recent Global Ballistic Missile Defense Assessment of regional missile defense capabilities relative to meeting the operational needs of the commanders of the geographic combatant commands, including the need for force protection of forward-deployed forces and capabilities of the United States and for the defense of allies and partners of the United States.
B	An assessment of whether and how the currently planned phased, adaptive approach to missile defense in Europe and other planned regional missile defense approaches and capabilities of the United States meet the integrated priorities of the commanders of the geographic combatant commands to achieve the operational requirements of the commanders to defend against the ballistic missile threat to deployed forces of the United States and allies of the United States, including a description of planned force structure deployment options to increase missile defense capabilities in the area of responsibility of a commander, if needed, in the event of warning of an imminent ballistic missile attack.
C	A detailed explanation of the current and planned concept of operations for the phased, adaptive approach to missile defense in Europe, including <ul style="list-style-type: none">• arrangements for allocating the command of assets of such approach between the Commander of the United States European Command and the Supreme Allied Commander, Europe;^a• an explanation of the circumstances under which such command would be allocated to each commander; and• a description of the prioritization of defense of both the deployed forces of the United States and the territory of the member states of the North Atlantic Treaty Organization (NATO) using available missile defense interceptor inventory.^b
D	A description of the progress made in the development and testing of elements of systems intended for deployment in Phases 2 and 3 of the phased, adaptive approach to missile defense in Europe, including the Standard Missile-3 (SM-3) block IB, the SM-3 block IIA interceptors, and the Aegis Ashore system, and any areas where work remains to ensure such phases are ready for deployment as specified in the 2010 BMD Review. ^c
E	A description of the manner in which elements of regional missile defense architectures, such as forward-based X-band radars in Japan, Israel, Turkey, and the area of responsibility of the Commander of the United States Central Command, contribute to the enhancement of the homeland defense of the United States. ^d
F	A description of the manner in which enhanced integration of offensive military capabilities and defensive missile defense capabilities, including the potential for improved intelligence, surveillance, and reconnaissance, will fit into regional missile defense planning and force structure assessments.
G	A description of how the contributions of allies and partners of the United States that have purchased missile defense technology of the United States could aid in reducing the costs of deployment of regional missile defense capabilities of the United States, and how the systems of such allies and partners could be better networked and integrated to provide mutual force multiplication benefits.

⁸See Pub. L. No. 113-66, § 233(b).

Element	Description
H	A description of how the Secretary of Defense is working with allies and partners of the United States that have purchased air and missile defense technology of the United States to integrate the capabilities of such allies and partners provided by such technology with the air and missile defense systems and networks of the United States to provide mutual benefit.

Source: National Defense Authorization Act for Fiscal Year 2014, Section 233. | GAO-15-32

^aDepartment of Defense (DOD) officials told us that the Commander of United States European Command and the Supreme Allied Commander, Europe, are roles that are normally held by the same individual; however, the officials said that the duties and priorities of the individual occupying these positions are distinct when serving these different roles.

^bMissile defense interceptors include the Patriot Advanced Capability-3 (PAC-3) and Standard Missile-3 (SM-3), which are intended to intercept enemy ballistic missiles before they reach their intended target.

^cThe results of the 2010 BMD Review were published in Department of Defense, *Ballistic Missile Defense Review Report* (Washington, DC: February 2010).

^dIn addition to its regional BMD mission, DOD has a BMD mission for homeland defense that is designed to defend the United States against long-range ballistic missile threats.

DOD identified its current approach to regional BMD in the 2010 *Ballistic Missile Defense Review Report*. In that report, DOD stated it would match U.S. BMD strategies, policies, and capabilities to the requirements of current and future threats and use that information to inform BMD planning, budgeting, and oversight. DOD also noted that phased, adaptive approaches to BMD would enable a flexible, scalable response to BMD threats around the world by incorporating new technologies quickly and cost-effectively, and described the advantages of mobile BMD assets that can be readily transported from one region to another, over fixed assets. In addition, DOD indicated that new assets would undergo testing that enables assessment under realistic operational conditions, prior to deployment. Finally, DOD emphasized working with regional allies to strengthen BMD and its deterrent value. The 2010 *Ballistic Missile Defense Review Report* indicates that the United States would pursue a phased, adaptive approach to missile defense within each region that is tailored to the threats and circumstances unique to each region. An area of emphasis in the 2010 *Ballistic Missile Defense Review Report* was on the EPAA—the U.S. approach to regional BMD in Europe.

In the 2010 *Ballistic Missile Defense Review Report*, DOD also discussed the development of regional phased, adaptive approaches to BMD in the Asia-Pacific and the Middle East. The 2010 report highlighted differences among the ballistic missile threat posed to each region, as well as the differences among the regional defensive arrangements that exist

between the United States and its partners.⁹ In an August 2013 report on regional BMD issues,¹⁰ DOD stated that its process of working with regional allies and partners was well under way and included the participation, along with the United States, of some allies and partners in regional command and control centers that conduct BMD operations. In the Pacific, DOD noted that cooperation is most robust with Japan, that other allies and partners participate to varying degrees, and that allies and partners in the Asia-Pacific region generally have exhibited an increasing interest in enhanced cooperation with DOD. DOD's August 2013 report also noted that in the Middle East the United States is working with a number of Gulf Cooperation Council States on a bilateral basis, including supporting the purchase of BMD systems through the Foreign Military Sales program.¹¹

DOD's regional BMD effort consists of a number of specific weapon systems or elements that compose the BMD system as a whole. They are the following:

- *Command and Control, Battle Management, and Communications (C2BMC)*: a system that integrates individual BMD elements and allows users to plan BMD operations, maintain situational awareness and communications, and manage networked sensors.
- *Army Navy/Transportable Radar Surveillance and Control Model 2 (AN/TPY-2) X-Band Radar*: a sensor that tracks ballistic missiles in flight.
- *Aegis BMD Weapons System*: a ship-based weapon system that consists of a radar, software, and processors to track threat missiles and cue Aegis Standard Missile-3 (SM-3) interceptors.

⁹For example, DOD noted that the United States engages in Europe as a party to a multilateral alliance, whereas it cooperates in East Asia through bilateral alliances and key partners.

¹⁰Department of Defense, *Report to Congress: Regional Ballistic Missile Defense* (Washington, DC: Aug. 23, 2013).

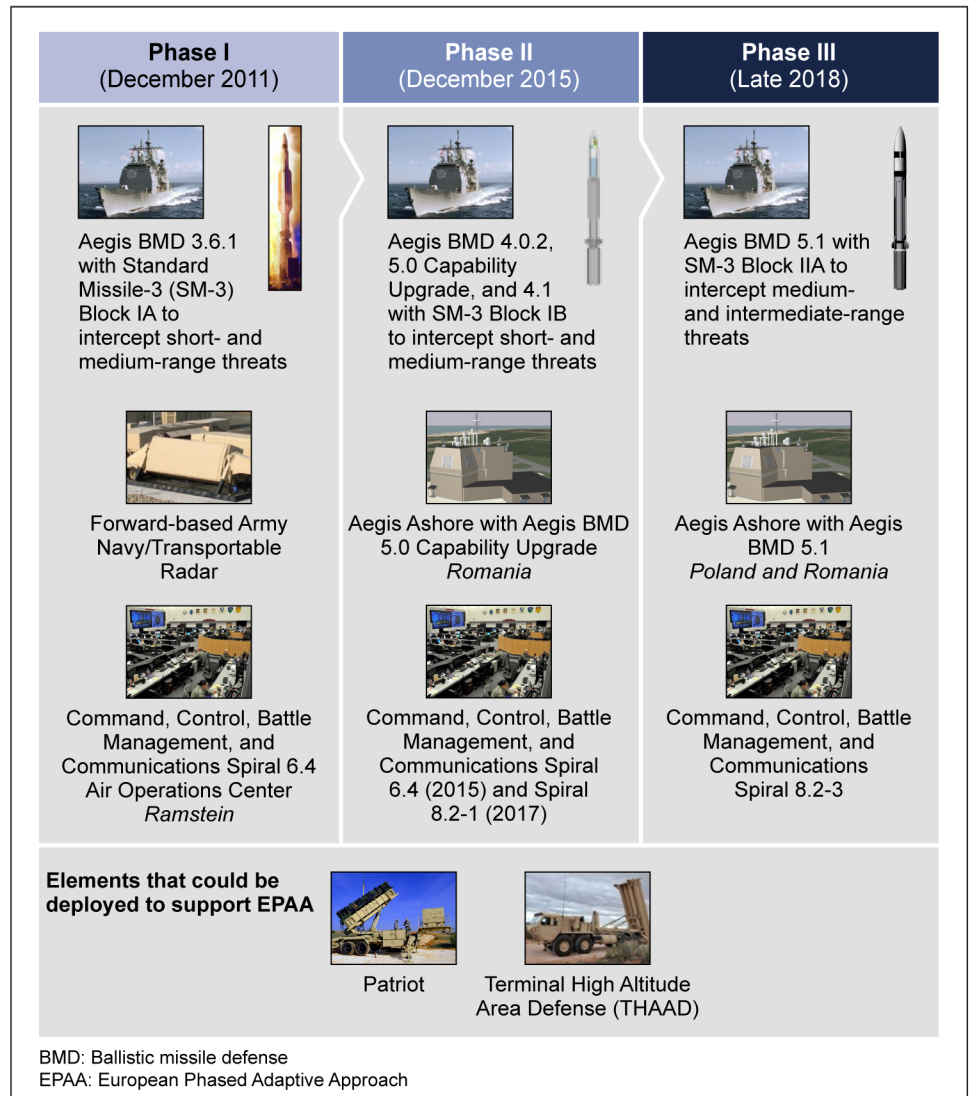
¹¹The Foreign Military Sales program is a form of security assistance authorized by the Arms Export Control Act. Among other things, it allows the United States to sell defense articles and services to foreign countries and international organizations when the President finds that to do so will strengthen the security of the United States and promote world peace.

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- *Aegis Ashore*: a land-based version of the Aegis BMD interceptor system, which will employ Aegis BMD Weapons System upgrades and SM-3 upgrades as they become available.
 - *Standard Missile-3 (SM-3)*: a family of defensive missiles that intercept regional threat missiles of various ranges.
 - *Terminal High Altitude Area Defense (THAAD)*: a mobile, ground-based missile defense system that includes a fire control and communications system, a radar, interceptors, and other support equipment.
 - *Patriot Advanced Capability-3 (PAC-3)*: a mobile defense against short-range missiles. It is now operated and fielded by the U.S. Army and may be used in a variety of regional BMD approaches.

According to DOD, various versions of these weapon systems are being deployed in Europe, the Asia-Pacific region, and in the Middle East, but the EPAA is the only regional approach described extensively in the 2010 *Ballistic Missile Defense Review Report*. To support Phase 1 of the EPAA for operations in Europe, by December 2011 MDA delivered an AN/TPY-2 X-band radar, an Aegis BMD ship with SM-3 Block IA missiles, and an upgrade to C2BMC. As we reported in March 2014,¹² Phases 2 and 3 of the EPAA are intended to provide improved integration and interoperability among sensors and interceptor systems, which would expand the area being defended, as well as improve the ability to defend against attacks involving a larger number of incoming missiles. Specifically, for Phase 2, MDA plans to deploy improved versions of the Aegis BMD Weapons System on ships and Aegis Ashore in Romania with the next generation of SM-3 interceptor, called SM-3 Block IB. MDA also plans to field improvements to C2BMC, upgrading an existing version in the 2015 time frame and fielding a new version in 2017. For Phase 3, MDA is developing further improvements to the Aegis BMD system, including a new version of the weapons system and new interceptor, called SM-3 Block IIA, as well as an additional Aegis Ashore installation in Poland and further improvements to C2BMC for fielding in 2018. Figure 1 depicts the weapon systems that DOD plans to deploy in and around Europe in support of the EPAA in its three phases.

¹²GAO, *Regional Missile Defense: DOD's Report Provided Limited Information; Assessment of Acquisition Risks is Optimistic*, [GAO-14-248R](#) (Washington, DC: Mar. 14, 2014).

Figure 1: European Phased Adaptive Approach Time Frames and Elements



Source: GAO analysis of DOD documents (data); Missile Defense Agency and Air Force (images). | GAO-15-32

To address these missions DOD has assigned various organizations specific roles and responsibilities, including the following:

- MDA: responsible for the development, acquisition, testing, and enabling fielding of BMD system elements, including C2BMC as the integrating element, in close collaboration with the warfighter community and testing organizations.

-
- *The military departments:* responsible for providing forces and resources to support fielding the BMD systems and the specific BMD elements they operate. The Army operates the PAC-3 and THAAD systems and the AN/TPY-2 X-band radar, and the Navy operates Aegis BMD-equipped ships and will operate Aegis Ashore, including the SM-3 interceptor.
 - *The combatant commands:* responsible for planning and executing BMD operations in their geographic areas of responsibility. Combatant commands with regional BMD approaches include U.S. European Command, U.S. Central Command, and U.S. Pacific Command. The Commander of U.S. European Command is also currently the Supreme Allied Commander, Europe, of NATO, and controls U.S. BMD assets following a transfer of authority from one organization to the other. U.S. Strategic Command is responsible for synchronizing global BMD planning in coordination with other combatant commands, the services, MDA, and appropriate agencies.

Since the introduction of DOD's regional BMD approach in 2010, we have issued several reports on the development and implementation of the EPAA.¹³ In these reports, we made nine recommendations to the Secretary of Defense related to the cost, schedule, performance, testing, and overall management of BMD in Europe.¹⁴ Although DOD partially concurred or concurred with all of our recommendations, DOD has yet to

¹³In addition to [GAO-14-248R](#), we have issued the following reports: GAO, *Missile Defense: European Phased Adaptive Approach Acquisitions Face Synchronization, Transparency, and Accountability Challenges*, [GAO-11-179R](#) (Washington, DC: Dec. 21, 2010); *Ballistic Missile Defense: DOD Needs to Address Planning and Implementation Challenges for Future Capabilities in Europe*, [GAO-11-220](#) (Washington, DC: Jan. 26, 2011); *Missile Defense: Opportunity Exists to Strengthen Acquisitions by Reducing Concurrence*, [GAO-12-486](#) (Washington, DC: Apr. 20, 2012); *Ballistic Missile Defense: Actions Needed to Address Implementation Issues and Estimate Long-Term Costs for European Capabilities*, [GAO-14-314](#) (Washington, DC: Apr. 11, 2014).

¹⁴In [GAO-11-220](#) we recommended that DOD: (1) develop guidance that describes desired EPAA end states in response to concerns raised by key stakeholders, (2) develop life-cycle cost estimates for EPAA, (3) develop an integrated EPAA schedule, and (4) adopt operational BMD performance metrics for durability and effectiveness into BMD test programs. In [GAO-12-486](#) we recommended that DOD assess the extent to which EPAA capability delivery dates are contributing to concurrence and adjust EPAA schedule dates where benefits can be obtained. Finally, in [GAO-14-314](#) we recommended that DOD: (1) resolve infrastructure issues and overlapping operational priorities, and complete host-nation implementing arrangements; and (2) complete business-case analysis for long-term support strategies of forward-based radars and THAAD, and estimates of the long-term operating and support cost estimates for Aegis Ashore.

implement any of them as of September 2014.¹⁵ A list of our BMD reports issued since 2010, following DOD's issuance of the February 2010 *Ballistic Missile Defense Review Report*, appears in the Related GAO Products page at the end of this report.

Congress has previously required DOD to report on its regional BMD activities. DOD submitted a report on regional BMD issues in August 2013,¹⁶ in response to a reporting requirement in the National Defense Authorization Act for Fiscal Year 2013.¹⁷ In evaluating DOD's August 2013 regional BMD report in March 2014, we found that DOD provided information pertaining to all five topics that it was required to report on, and that it generally described DOD's plans and processes for regional missile defense. However, we concluded that there was more comprehensive information related to each of the topics that DOD could have provided to better reflect its current efforts and activities.¹⁸

¹⁵In August 2013, we determined that DOD had taken no actions to implement the recommendation made in [GAO-12-486](#), and we have closed that recommendation as not implemented. We will continue to follow up with DOD on the implementation of the remaining eight recommendations made in our other reports.

¹⁶DOD, *Report to Congress: Regional Ballistic Missile Defense*.

¹⁷Pub. L. No. 112-239, § 229(b) (2013).

¹⁸[GAO-14-248R](#). We found that DOD's August 2013 regional BMD report could have provided further details on (1) the adequacy of force protection, (2) regional priorities and capability needs, (3) global force management processes regarding BMD, and (4) partner coordination and cooperation. As to the remaining topic—a description of progress in system development and testing for EPAA and an assessment of technical and schedule risk—we found DOD's characterization of these acquisition-related risks to be optimistic. Noting the requirement in section 233(b) of the National Defense Authorization Act for Fiscal Year 2014 for DOD to report on regional BMD again, we did not make recommendations in our March 2014 report.

DOD's Report
Addressed or Partially
Addressed the
Required Reporting
Elements, but Did Not
Provide Additional
Key Details

DOD's Report Addressed
or Partially Addressed All
Eight of the Required
Reporting Elements

Compared to the statutory reporting requirements, DOD's June 2014 regional BMD report addressed five of the eight required reporting elements, and partially addressed the remaining three elements. DOD addressed elements that describe the overall risk assessment from the *Global Integrated Air and Missile Defense Assessment*,¹⁹ the role of regional missile defenses in the homeland defense mission, the integration of offensive and defensive capabilities, and two elements on the roles and contributions of allies. DOD partially addressed the remaining three reporting elements, regarding the alignment of regional approaches to missile defense with combatant command integrated priorities, the concept of operations for EPAA, and the testing and development of key EPAA elements. Table 2 summarizes our assessment of DOD's report.

¹⁹The *Global Integrated Air and Missile Defense Assessment* focuses on DOD's capability to meet the global force management of integrated air and missile defense, including BMD, as delineated in the operational plans of the geographic combatant commanders. U.S. Strategic Command, *Global Integrated Air and Missile Defense Assessment* (Omaha, NE: Aug. 7, 2013).

Table 2: GAO’s Assessment of the Extent That the Department of Defense’s (DOD) June 2014 Ballistic Missile Defense (BMD) Report Addressed the Required Reporting Elements

Required reporting element	GAO assessment	GAO comments
A (risk assessment)	Addressed	DOD’s report provided a description of the overall risk assessment from the 2014 Global Ballistic Missile Defense Assessment of regional missile defense capabilities by summarizing a number of crosscutting themes from that report.
B (combatant command requirements)	Partially Addressed	DOD’s report provided an overall description of the various regional requirements for missile defense in Europe, the Asia-Pacific region, and the Middle East. However, the report provides little information on planned force structure deployment options to increase capability when required, which DOD manages through its Global Force Management process. ^a DOD officials explained that the detailed deployment and availability information changes frequently and is provided to Congress in separate briefings, which is why they excluded it from this report.
C (concept of operations for the European Phased Adaptive Approach [EPAA] including allocation of command)	Partially Addressed	DOD’s report provided information regarding arrangements for allocating the command of assets between U.S. European Command and the North Atlantic Treaty Organization (NATO) by referencing a briefing that had already been provided to the House and Senate Committees on Armed Services. DOD officials told us that all three aspects of this element were addressed in the briefing previously provided to Congress. However, we believe DOD did not clearly explain the circumstances dictating when command would be allocated to U.S. European Command versus NATO. Finally, when we reviewed DOD’s briefing we found that it provided some broad information related to defended asset prioritization without fully explaining that prioritization.
D (development and testing of EPAA)	Partially Addressed	DOD’s report provided a description of the progress made in the development and testing of certain systems, and noted where work remains with respect to those systems; however, it did not identify work remaining to implement C2BMC, without which Phases 2 and 3 of the EPAA cannot be ready to deploy as specified in the 2010 <i>Ballistic Missile Defense Review Report</i> . DOD officials agreed that C2BMC is a key component of the EPAA.
E (regional BMD contributions to defending the United States)	Addressed	DOD’s report described the manner in which regional BMD systems could contribute to the homeland defense mission, while acknowledging that regional BMD assets have limited utility in that area.
F (offensive-defensive integration)	Addressed	DOD’s report described the integration of offensive and defensive capabilities and provided a description of how improved intelligence, surveillance, and reconnaissance will improve regional BMD. DOD also referenced the <i>Joint Integrated Air and Missile Defense Vision 2020</i> report in response to this reporting element. ^b
G (costs offset and force multiplication benefits from allied contributions)	Addressed	DOD’s report described how the acquisition of U.S.-developed systems by allies reduces costs in two ways: (1) allowing the United States to take advantage of economies of scale, and (2) providing savings by reducing deployment costs. In addition, DOD described steps being taken to enhance the networking and integration of allied capabilities.
H (working with allies to integrate capabilities)	Addressed	DOD’s report described the extent to which it is working with allies to integrate capabilities with U.S. systems and networks to provide mutual benefit. DOD provided details on a variety of systems for more than 16 countries across Europe, the Asia-Pacific region, and the Middle East.

Source: GAO analysis of DOD data. | GAO-15-32

Notes: Data are from DOD’s June 2014 BMD report.

^aGlobal Force Management is the process DOD uses to align U.S. forces in support of the National Defense Strategy and to meet combatant command force requirements.

^bDepartment of Defense, *Joint Integrated Air and Missile Defense: Vision 2020* (Washington, DC: Dec. 5, 2013).

DOD's Report Did Not Provide Additional Key Details

Additionally, through interviews with DOD officials and from our application of generally accepted standards that define a sound and complete defense research study, we found that DOD's report did not include key details for some required reporting elements that we believe could have benefitted congressional defense committees' oversight of DOD's regional BMD programs. Generally accepted standards that define a sound and complete defense research study include that a report provide complete, accurate, and relevant information for the client and stakeholders.²⁰ However, DOD's report does not consistently meet this standard, based on GAO's review. For example, the standards for the presentation of results state that findings should be complete and accurate, but we found that key information regarding the characterization of the testing and development of EPAA systems was incomplete.

DOD's June 2014 report could have provided additional details for several of the required reporting elements. Specifically:

- In support of element F, regarding integration of offensive and defensive capabilities, the report described some plans regarding implementation of the imperatives suggested in the *Joint Integrated Air and Missile Defense Vision for 2020*. We determined that DOD's report met the statutory requirement to describe the manner in which enhanced integration of offensive and defensive capabilities will fit into regional missile defense planning and force structure assessments. Although not required, we found the report did not provide comprehensive information on how DOD will identify and address potential capability and capacity shortfalls in support of air and missile defense missions, nor did it provide a description of policies to increase cooperation among partners and allies, as emphasized by the *Joint Integrated Air and Missile Defense Vision for 2020*, which is information that provides more insight into how DOD manages regional BMD resources and risks.

²⁰We identified generally accepted standards for a sound and complete defense research study in our work for [GAO-06-938](#).

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- In support of elements G and H, regarding allied contributions to regional BMD, DOD's report included some information that did not relate to regional missile defense and characterized a number of allied contributions as notional, which could misrepresent the extent to which particular allies and partners contribute to regional BMD. For example, the report mentions Denmark hosting an Upgraded Early Warning Radar in Greenland as an allied contribution to European missile defense, but that radar is used exclusively for supporting the homeland defense BMD mission. Additionally, the report did not include estimates of actual or potential cost savings derived from taking advantage of economies of scale or a reduced number of U.S. deployments due to allied capabilities. For instance, Japan's effort to develop and deploy the Aegis BMD Weapon System on Japanese ships is mentioned by the report, but without concrete information on the effect that may have on U.S. resources. Appendix I highlights U.S. and allied contributions to regional BMD operations.

Additionally, we determined that DOD's report omitted key details regarding its approach to regional BMD for the three elements that it partially addressed in the report, regarding the combatant commands' force structure and deployment options, concepts for operating with NATO, and the development of EPAA systems. We believe that by not including these details, although not required, DOD reduced the report's usefulness to the congressional defense committees and to their oversight of DOD's regional BMD programs.

Combatant Command Force
Structure Deployment Options
Lacked Both Detail and a
Comparison with Integrated
Priorities

In support of element B, regarding the combatant commands' deployment options, as stated earlier, we determined that DOD's report partially addressed the required reporting element because it did not include key details about U.S. European Command's and U.S. Pacific Command's planned options to increase BMD capability in response to an imminent threat, nor did the report provide a comprehensive analysis regarding how the various regional approaches to BMD will meet combatant command integrated priorities. DOD's report also did not provide an analysis of the BMD assets that each combatant command needs to meet their respective integrated priorities, nor did it describe how many assets each combatant command has in-theater to address these requirements, or identify how many assets DOD could reasonably deploy into the area if additional capability were needed during a crisis. U.S. Strategic Command and the Joint Staff track the deployment and availability of BMD forces, such as the Aegis BMD Weapon System, THAAD, and PAC-

3, and make priority recommendations for their deployment, so that senior DOD decision makers can assess risk and priorities when allocating assets among regions.²¹

Description of European Command and Control Lacked Key Details

In support of element C, related to operational control of assets in Europe, we found that DOD's report lacked key details about how command of assets are allocated between U.S. European Command and NATO. For example, in the briefing referenced by the report, DOD provides some description of how Aegis ships would be transferred from one command's authority to the other and provides the current operational control status for the forward-based AN/TPY-2 X-band radar. However, neither the report nor the briefing contain the operational details that are important to fully understanding the circumstances under which each of the relevant BMD systems could be transferred from one command's authority to another. This information is important to fully understanding the implications of how control of BMD assets is allocated, as well as the effect those circumstances have on various BMD systems.

Report Did Not Describe Key C2BMC or Aegis BMD Issues in Describing EPAA Testing and Development

In support of element D, regarding the development and testing of BMD systems that are part of EPAA, DOD's report did not include details about C2BMC and Aegis BMD testing and development issues, and the lack of such detail may limit Congress' ability to understand the extent to which the EPAA system can be integrated:

- *C2BMC: The 2010 Ballistic Missile Defense Review Report* and MDA's acquisition and system engineering documentation underscore the importance of C2BMC for all regional approaches, since it is the system that enables system-level capabilities. In EPAA, C2BMC is necessary to link allied systems, such as NATO's Active Layered Theater Ballistic Missile Defense, with the U.S. systems.²² It also controls the AN/TPY-2 X-band radar, and integrates Aegis BMD ships, as well as additional sensors and an Aegis Ashore as they

²¹U.S. Strategic Command assists the Joint Force Provider in recommending how to meet combatant commands' requests for BMD forces.

²²Active Layered Theater Ballistic Missile Defense is NATO's command and control system, which interfaces with the U.S. C2BMC to integrate U.S. systems with some European NATO states. It is designed to allow NATO's military commanders to plan a missile defense battle, link radars and interceptors from participating member states, receive early warning of inbound ballistic missiles, and monitor—and, to a limited degree, direct—a theater missile defense battle.

become available in Phases 2 and 3. As the integrator, C2BMC allows the BMD system to defend against more missiles simultaneously, to conserve interceptor inventory, and to defend a larger area than individual systems operating independently. For Phase 2 of the EPAA, MDA plans to upgrade the C2BMC system in 2015 to address new threats and, in 2017, to integrate additional sensors and improve the ability of Aegis BMD to launch an interceptor before its shipboard radar acquires a threat missile. In 2018, for Phase 3 of the EPAA, MDA plans additional C2BMC upgrades, including some that would enable the Aegis BMD to intercept missiles based on tracks passed through C2BMC from forward-based AN/TPY-2 X-band radars, without having to detect the threat with its own radar. However, our current and previous work indicates that some capability upgrades to C2BMC for Phase 3 of the EPAA have been deferred indefinitely, which DOD did not reference in its June 2014 report.²³ For example, according to our analysis of MDA's system engineering documentation, we found that MDA has deferred the delivery of a key C2BMC capability that would further integrate the BMD system and improve its management of limited BMD resources by allowing C2BMC to directly send engagement commands to interceptor systems. According to the Director, Operational Test and Evaluation, effective "battle management" requires C2BMC to not only collect and process information from sensors and weapons, as it currently does, but to also determine which threats should be engaged by which weapon to produce the highest probability of engagement success and then transmit this information back to the sensors and weapons.²⁴

- *Aegis BMD Weapon System:* DOD's report did not fully describe the performance and acquisition risks to the Aegis BMD systems slated for Phase 2 of the EPAA, which we have identified through our prior work.²⁵ Aegis BMD is the primary interceptor system for EPAA. MDA plans upgrades for Phase 2 of the EPAA that increase the types and number of threats it can engage. However, in April 2014, we found that one SM-3 Block 1B failed in flight during an interceptor test in September 2013, which, according to our current work, could increase

²³[GAO-14-248R](#).

²⁴Director, Operational Test and Evaluation, *2013 Assessment of the Ballistic Missile Defense System (BMDS)* (Washington, DC: Feb. 14, 2014).

²⁵[GAO-14-248R](#).

reliability risk.²⁶ Since then, DOD officials told us that MDA is seeking to maintain reliability of the interceptor by developing a redesign; it is unclear when this redesign will be flight-tested. MDA told us that it plans to ground-test the redesign. Moreover, our reviews of MDA's Aegis BMD Baseline Execution Reviews from April 2013, August 2013, and June 2014 indicated that the certification of a new version of Aegis BMD software called Aegis BMD 4.1, which is needed for Phase 2, had been delayed at least 3 months past Phase 2 declaration.²⁷ Additionally, based on our analysis of MDA's August 2013 and June 2014 Baseline Execution Reviews, MDA continues to discover software defects faster than it is able to fix them for another version of Aegis BMD, also planned for Phase 2 of the EPAA.²⁸ Furthermore, although DOD officials told us that the Aegis Ashore program is on track, our review of MDA's March 2014 test documentation identified schedule slips that delayed Aegis Ashore's participation in key interoperability tests, compressing the time to rectify issues should they be discovered prior to the planned Phase 2 declaration in 2015.²⁹

DOD officials who developed the June 2014 regional BMD report told us that they used their best judgment in determining the appropriate level of detail for the report. The officials added that their goal was to address each of the required reporting elements concisely. Furthermore, they explained that they regularly provide more detailed analysis on some of

²⁶GAO-14-351. The test failure occurred during a salvo test, where two interceptors were launched against a single target. While the first interceptor engaged the target, the second missile failed in flight. In this report we recommended (1) any changes to the SM-3 Block IB be flight tested before DOD approves full production; (2) retest the fielded GMD interceptor to demonstrate performance; and (3) improve the content of its schedule baselines. DOD partially concurred with the first recommendation, nonconcurred with the second, and concurred with the third, stating that the production and testing decisions will be made using the proper DOD processes.

²⁷Aegis BMD 4.0.2/SM-3 Block IB Baseline Execution Review dated April 12, 2013, Aegis BMD Modernization Program Baseline Execution Review dated August 29, 2013, and Aegis BMD Weapon Systems Baseline Execution Review dated June 10, 2014. Baseline Execution Reviews document MDA program acquisition issues and program progress against acquisition baselines.

²⁸Aegis BMD Modernization Program Baseline Execution Review dated August 29, 2013, and Aegis BMD Weapon Systems Baseline Execution Review dated June 10, 2014.

²⁹Integrated Master Test Plan Version 14.1 Smart Book dated March 31, 2014. The Integrated Master Test Plan Smart Book presents an unclassified overview of MDA's test program that is presented in more detail in the Integrated Master Test Plan.

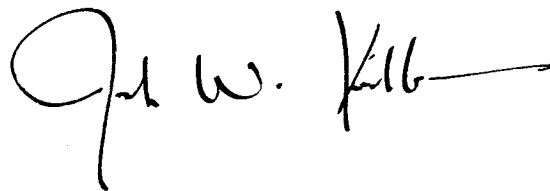
these topics to congressional defense committees via periodic briefings, and that they did not want to provide duplicative or unnecessary information. Although we recognize the need for professional judgment by DOD officials when preparing the report, our review concluded that DOD's report did not include details that we believe could have made the report more useful to Congress in its oversight of DOD's regional BMD programs. However, DOD's report was prepared in response to a onetime, nonrecurring mandate, and therefore we are not making any recommendations to amend the report and provide additional detail.

Agency Comments

DOD reviewed a draft of this report, but did not provide formal agency comments. DOD did provide technical comments, and we incorporated these changes as appropriate.

We are sending copies of this report to the appropriate congressional committees and to the Secretary of Defense; the Chairman, Joint Chiefs of Staff; the Commander, U.S. Strategic Command; and the Director, MDA. This report is also available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at 202-512-9971 or KirschbaumJ@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix II.

A handwritten signature in black ink, appearing to read "Joe W. Kirschbaum", with a long horizontal stroke extending to the right.

Joseph W. Kirschbaum
Director
Defense Capabilities and Management

List of Addressees

The Honorable Carl Levin
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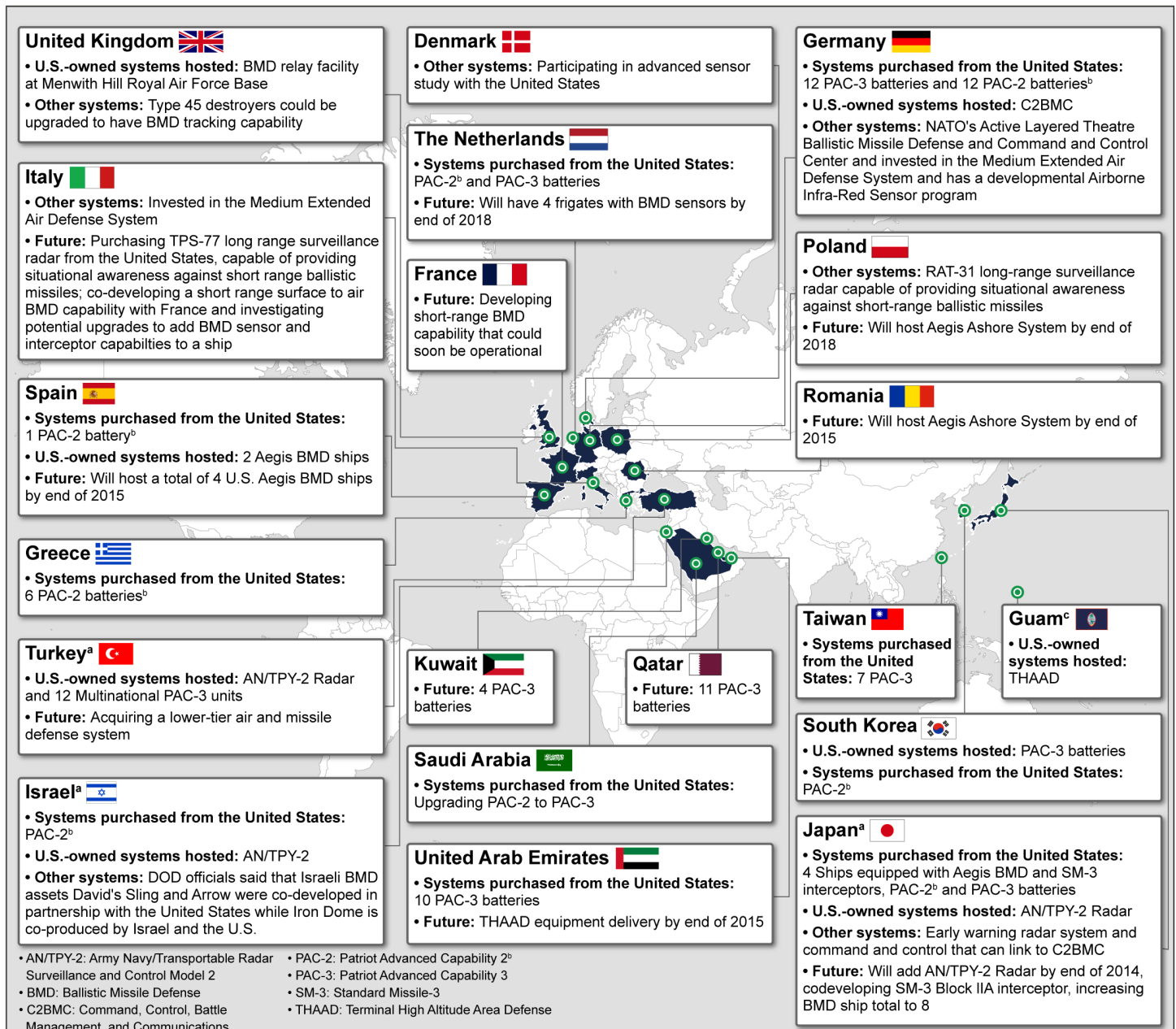
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Appendix I: Allied Contributions to Regional Ballistic Missile Defense (BMD)

Figure 2 summarizes key information provided by the Department of Defense (DOD) regarding the contributions of allies to regional BMD.

Figure 2: Allied Contributions to Regional BMD



Source: GAO analysis of Department of Defense data. | GAO-15-32

**Appendix I: Allied Contributions to Regional
Ballistic Missile Defense (BMD)**

^aAlthough three AN/TPY-2 radars are annotated, DOD has deployed five forward-based radars: Israel, Turkey, Japan (2 radars), and a fifth radar in the U.S. Central Command area of operations.

^bPAC-2 has limited ballistic missile defense capabilities.

^cGuam is a territory of the United States, but is depicted here due to its role in regional BMD.

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

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Staff Acknowledgments

In addition to the contact named above, Kevin O'Neill, Assistant Director; David Best; Patricia Donahue; Amie Lesser; Randy Neice; Wiktor J. Niewiadomski; Richard Powelson; Terry Richardson; Mike Shaughnessy; and Jina Yu made key contributions to this report.

Related GAO Products

Ballistic Missile Defense: Actions Needed to Address Implementation Issues and Estimate Long-Term Costs for European Capabilities. [GAO-14-314](#). Washington, D.C.: April 11, 2014.

Missile Defense: Mixed Progress in Achieving Acquisition Goals and Improving Accountability. [GAO-14-351](#). Washington, D.C.: April 1, 2014.

Regional Missile Defense: DOD's Report Provided Limited Information; Assessment of Acquisition Risks is Optimistic. [GAO-14-248R](#). Washington, D.C.: March 14, 2014.

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